ENTOMOLOGICAL NEWS

JULY, 1937

Vol. XLVIII No. 7

CONTENTS

Johnson—New Species of Saturniidae (Lepidoptera). 181
Projected Monograph of Coleoptera of Alabama. 183
Montgomery—Insect Stamps. 184
Hess—Moulting in Some Lepidoptera 186
Fox and Osterman—Some Records of Orthoptera From South-western Pennsylvania 195
Woodcock—Pairing of Males of Samia cecropia. (Lep.: Saturniidae).. 200
Frost—New Records from Bait Traps. (Dipt., Coleop., Corrodentia).. 201
Entomological Literature 203
Review of Reinig's Melanismus, Albinismus und Rufinismus 209
Review of Osborn's Fragments of Entomological History. 211
Some Current Items 212

PHILADELPHIA, PA.
THE ACADEMY OF NATURAL SCIENCES,
1900 Race Street

Entered at the Philadelphia, Pa., Post Office as Second Class Matter.
Acceptance for mailing at the special rate of postage prescribed for in Section 1.
Act of October 3, 1917, authorized January 15, 1921.

ENTOMOLOGICAL NEWS

published monthly, excepting August and September, by The American Entomological Society.

Philip P. Calvert, Ph.D., Editor; E. T. Cresson, Jr., R. G. Schmieder, Ph.D., V. S. L. Pate, Associate Editors.

Advisory Committee: Philip Laurent, J. A. G. Rehn, Chas. Liebeck, J. Chester Bradley, Ph.D., Frank Morton Jones, Sc.D., John C. Lutz, Max Kisliuk, Jr., Wm. W. Chapman.

The subscription price per year of ten (10) numbers is as follows: United States and possessions, Central and South America $3.00, Canada $3.15, Foreign $3.25, Single copies 35 cents.

ADVERTISING RATES: Full width of page. Payments in advance.

One issue, 1 in., $ 1.20, 3 in., $ 3.00, 5 in., $ 5.00, 7 in., $ 7.00
Ten issues, " 8.00, " 25.00, " 45.00, " 60.00

SUBSCRIPTIONS. All remittances and communications regarding subscriptions, non-receipt of the "News" or of reprints, and requests for sample copies, should be addressed to

ENTOMOLOGICAL NEWS, 1900 Race Street, PHILADELPHIA, PA.

MANUSCRIPTS AND ADVERTISEMENTS should be sent to the editor, Dr. P. P. Calvert, Zoological Laboratory, University of Pennsylvania, Philadelphia, Pa.

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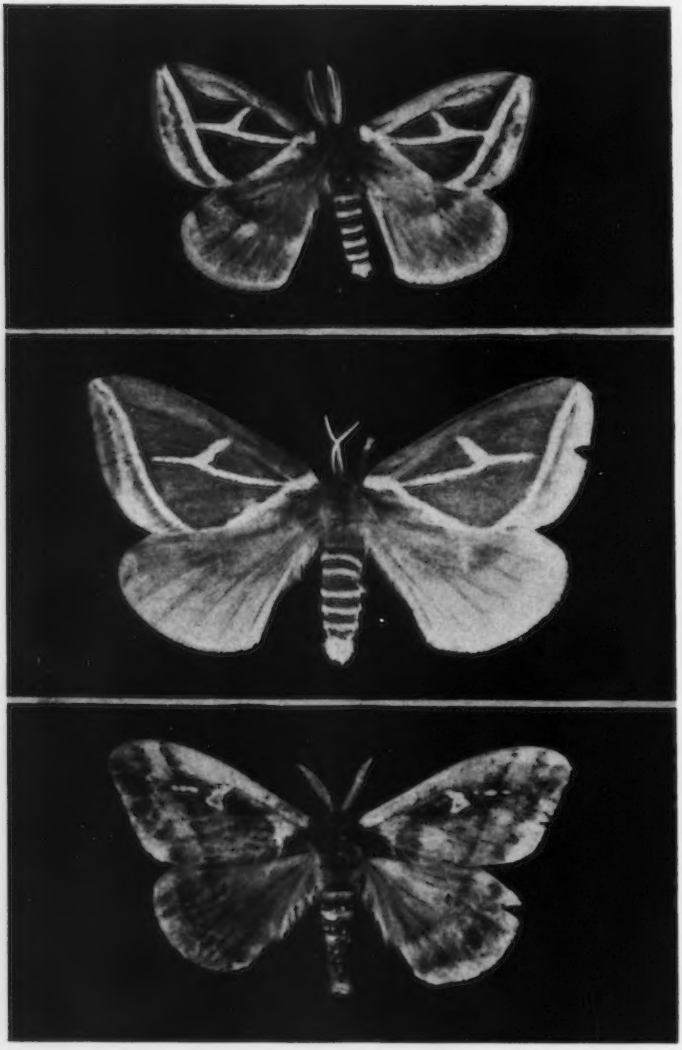
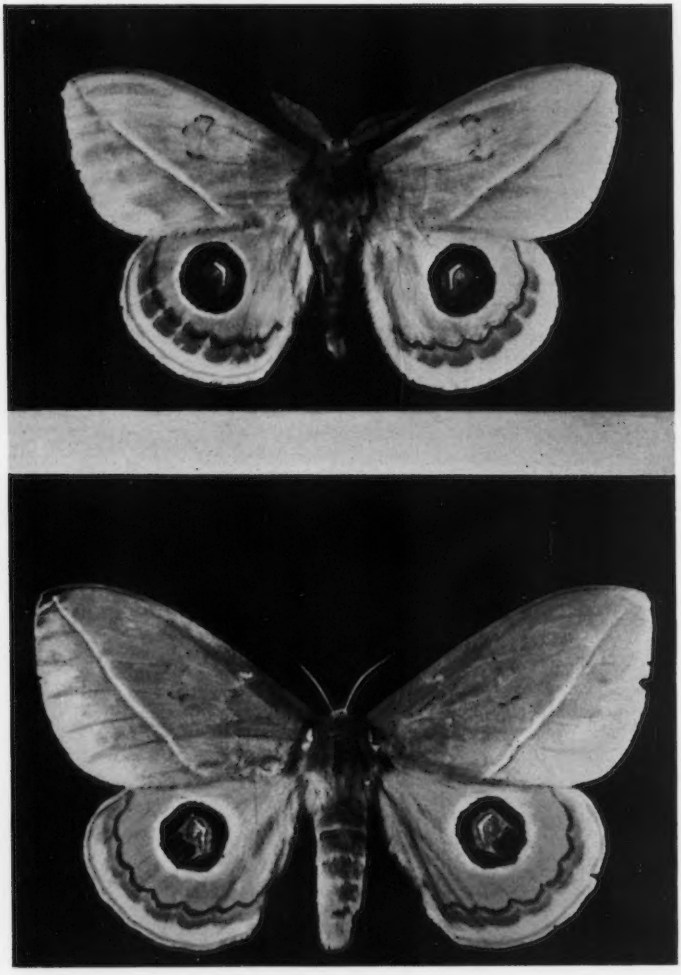


DIRPHIA UNDULINEA N. SP, 1♂, 2♀. D. TRIPICATA N. SP. 3♂—JOHNSON.



AUTOMERIS SUAVINA N. SP., 4♂, 5♀—Johnson

ENTOMOLOGICAL NEWS

VOL. XLVIII. JULY, 1937 No. 7

New species of Saturniidae (Lepidoptera)

By FRANK JOHNSON, New York City.

(Plates IV and V.)

Dirphia undulinea n. sp. (Plate IV, figs. 2 ♀, 1 ♂).

♀: Head, thorax and fore wing dark olive brown; antennae pinard yellow. Abdomen black above crossed by segmental light cadmium lines; abdomen below dark olive brown; a lateral series of white points.

Fore wing: a thick white spot at base of costa from which two white lines diverge, one to middle of inner margin, the other close below median vein, slightly interrupted near discocellular, then joined by a white line on discocellular, and continued along vein 4 to subterminal line, the latter slightly sinuous from close to apex to inner margin before tornus; the termen paler with a narrow dark shade adjoining the subterminal line, and diffuse dark spots towards apex. Fore wing below more grayish brown, the subterminal line indicated by diffuse whitish spots on interspaces.

Hind wing above light cinnamon drab, faintly suffused with roseate; a minute whitish point at end of cell; a broad dark medial shade, and a broader subterminal shade. Hind wing below deep brownish drab a light brownish gray shade, and a fine black streak on discocellular; a vinaceous gray lunular dentate subterminal line.

Expanse: 70 mm.

Habitat: Sta. Catharina, BRAZIL. The unique female above described is the *type* of the species. I subsequently received a male which is also figured, Plate IV, fig. 1.

Dirphia tripicata n. sp. (Plate IV, fig. 3.)

♂: Antennae chamois. Head, thorax and abdomen above fuscous; abdomen dorsally with some fine pale transverse lines; white points laterally, and some roseate hairs at base laterally; anal hairs apricot buff.

Fore wing: a large pale vinaceous lilac space at base, somewhat triangular, broad at costa, narrowing to a point at submedian vein, dark edged on basal side; medial space dark slate violet, expanding at subcostal, containing a short white streak below cell, a larger heart-shaped spot at discocellular, containing a fine dark line and a point, and a series of white points

below vein 5, termen broadly light vinaceous roseate with a dark postmedial inbent from costa and a similar subterminal shorter line; from vein 6 to vein 3 a dark slate violet patch, its inner edge incurved; a wavy subterminal line from vein 6 to vein 3. Fore wing below mostly vinaceous, darkest at base of costa and in cell; a pale spot on discocellular traces of a dark incurved subterminal line, and a wavy line above tornus.

Hind wing above with the base broadly deep pink, the medial space vinaceous fawn, the termen broadly dull indian purple. Hind wing below as in fore wing; a fine, dark, wavy medial line; a similar lunular subterminal line.

Expanse: 63 mm.

Habitat: Sta. Catharina, BRAZIL. Possibly an aberration of *D. trisignata* Feld.

Automeris suavina n. sp. (Plate V, figs. 4 ♂, 5 ♀).

♂: Antennae tawny olive. Head, collar and thorax sorghum brown; abdomen above black; thorax and abdomen below, including anal hairs avellaneous.

Fore wing vinaceous fawn with darker shading at base and terminally on interspaces before and beyond the subterminal line, terminally the dark shading is broken into spots; traces of an antemedial line; a black line at base of wing, followed on inner margin by roseate hairs; the discal spot formed of fine short lines, partly double, somewhat outcurved at costa; subterminal line whitish, distally dark edged, from costa close to apex, straight to vein 1 about middle of margin. Fore wing below light russet vinaceous; a large black discal spot containing a small white spot; subterminal line black, cut by veins.

Hind wing above; the inner margin broadly deep roseate from base to subterminal line; annulus large, somewhat oval, black finely edged by a yellow line, and containing a small cluster of grayish scales and a very fine white streak, the postmedial space to line purplish vinaceous; the subterminal line lunular dentate, black, sharply defined, outwardly edged with livid brown; termen flesh pink, narrowing towards costa. Hind wing below like fore wing; a white point at discocellular and a slight black shade; a postmedial fine, dark wavy line; a very faint subterminal shade.

♀: Head and thorax saccardo's olive; abdomen dorsally from base deep grayish olive; beyond middle with transverse lines and the two terminal segments entirely also the underside deep olive buff.

Fore wing largely purplish citrine, darkest on basal third of costa;; a distinct pale antemedial line, outcurved on costa, then nearly vertical; the discal points indistinct, the subterminal line as in male.

Hind wing above to line as in male, but the inner margin not so red; the ocellus with more numerous grayish scales; lines and termen as in male. Hind wings below nearest ecru drab, but somewhat suffused with roseate also the veins; the base and costa of fore wing somewhat darker; the discal spots and lines as in male.

Expanse: ♂ 77 mm., ♀ 82 mm.

Habitat: Sta. Catharina, BRAZIL. The male described is the *type* of the species.

The types of all three species will be placed in the U. S. National Museum, Washington.

Projected Monograph of Coleoptera of Alabama.

A cross-section survey of wildlife conditions will begin this month in three of Alabama's state parks with the lowly beetle serving as a biological index for the study, according to field reports received by the National Park Service at its regional headquarters in Richmond, Va.

Six-month studies have been arranged for Chewacla State Park, near Auburn; De Soto State Park, near Fort Payne, and Monte Sano State Park, near Huntsville. An enrollee of a Civilian Conservation Corps camp at each park will be chosen to make collections of the insects and forward them with appropriate information to the Alabama Museum of Natural History. When the youths are selected, they will receive intensive training for two weeks as members of the Museum's annual entomological expedition. Similar studies are planned tentatively for other parks of the state system.

Final reports on findings at each park will serve as a basis for general biological study designed for preservation or improvement of environmental conditions favorable to propagation and development of wild animal and bird life. The survey also will contribute data for publication of a monograph on the "Coleoptera of Alabama" to be issued by the Museum of Natural History. The work has been in progress for nearly 20 years. The cooperative park program is expected to advance publication by 10 years.

General development work at all parks of the state network is being carried forward by CCC units under joint supervision of the National Park Service and the Alabama Commission of Forestry, represented by Col. Page S. Bunker. Dr. Walter B. Jones is director of the Museum.

UNITED STATES DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE, Regional Office, Region One, Richmond, Virginia.

Insect Stamps.

By B. Elwood Montgomery, Purdue University, Lafayette, Indiana.

For a number of years I have been collecting information about the use of, or the reference to insects in various fields of human activity, such as: musical compositions inspired by insects, literary references to insects, insect designs in art, heraldry, and philately, etc. I have found such "supplementary" entomological material of considerable value in insect nature study work with Boy Scouts and high school Biology students and of some use, even, in teaching Entomology to university students. My interest in "insect stamps" was reawakened by reading, "A Veteran's Appeal" in the April, 1935, isue of The News (p. 107). Through the assistance of Richard McP. Cabeen, stamp editor of the Chicago Tribune and other philatelists, I have obtained information of nine issues of postage and revenue stamps of entomological interest.

The most popular entomological design on stamps is the beehive, i.e., the traditional dome-shaped straw skep. This has appeared on at least four issues of stamps, including a Hungarian postage stamp; a United States proprietary issue and two American local stamps.

The Hungarian stamp is one of the 60 to 80 varieties of the Banet issue. This issue was one of several printed at Temesvar during the short time between the Serbian evacuation and the Roumanian occupation. Although used to some extent for postage these stamps were employed chiefly for paying the salaries of postal authorities! This particular stamp is catalogued as a 50-feller surcharge on a 10-feller stamp, but I have been unable to secure copies of any except the original type without surcharge. The hive appears in the design immediately below the central circular medallion. The stamp is printed in violet brown. I do not know of any significance of the hive in the design.

The beehive forms the central design on stamps of the Chi-

cago and the Dupuy & Schenck (New York) "Penny Post." In the Chicago stamp the hive appears in an oval medallion, surrounded by a ribbon bearing the words, "CHICAGO" above and "PENNY POST" below, then grill work and finally lines forming a box. The Dupuy & Schneck stamp consists merely of the picture of a hive and lettering ("DUPUY & SCHENCK" and "PENNY POST") enclosed in a rectangular box. The former stamp is orange brown on white paper, the latter black on light grey paper. Both of these stamps are very rare and I have not seen the originals, but Mr. H. C. Needham, an authority on local issues, has kindly sent me for examination "good counterfeits" from his reference collection. He also furnished me (in litt., May 18, 1935) the following information concerning the stamps:

"Chicago Penny Post was established in Chicago as a local Delivery Post about 1862 by Edward Cooke; he was in that year a Newsman, residence 208 West Jackson Street; was associated with S. C. Griggs & Co., booksellers; . . ."

"Dupuy & Schenck: In February, 1842, Henry J. Dupuy and Jacob H. Schenck were mail carriers under Alexander M. Greig in the business of the then City Despatch Local Post. This post was taken over by the Governmental Postmaster at New York City on or about August, 1842, and became known as the United States City Despatch Post. Mr. Greig retired in November, 1844, and these two men were among those who signed a memorial and best wishes for his future success. The stamp was in use apparently from 1846 to 1848 inclusive."

Charles N. Crittenton, who manufactured "Pike's Toothache Drops" and "Glenn's Sulphur Soap" about the time of the Civil War, used a revenue stamp with a bee hive design. The hive, with a background of pine trees and a flowering shrub in the foreground, forms the design of a central oval medallion. The stamp appeared in two values, one and two cents, the former in both blue and black, the latter in black. I have wondered if the products contained either honey or beeswax. Mrs. C. L. Manning, Philatelist of the U. S. National

Museum, furnished me the following information about private proprietary stamps:

"Stamps of special design were supplied by the United States Government to manufacturers for the payment of the tax on patent medicines. These stamps were printed by the Government and in addition to the face value, representing the tax, the firms desiring these special stamps were required to pay the cost of engraving the individual dies, making the plates, etc."

Since the preceding article was written Mr. Curtis Benton, a very enthusiastic entomologist-philatelist, has called my attention to some additional "insect stamps". In the 1932 series of stamps issued for Italian Somaliland three values (1.25, 1.75 and 2 lire, in dark blue, red orange and carmine, respectively) had a design consisting of a large termite nest with a native standing beside it. In 1934 the 1.25 lira value was surcharged, "ONORANZE AL DUCA DEGLI ABRUZZI", to form part of the Abruzzi commemorative issue. A set of stamps issued by Spain in 1934 in commemoration of the 300th anniversary of the death of Lope de Vega included a 15 centimo, myrtle green stamp, which shows some sort of an insect lying on its back—obviously dead. The design was taken from a bookplate of de Vega, and the insect is said to have been intended to represent a critic of the great author. The identity of the insect is in doubt—it resembles, somewhat, both a cockroach and a lamellicorn beetle.

Moulting in Some Lepidoptera.

By Bertha M. Hess, Philadelphia, Penna.

(Continued from page 156.)

Hyphantria cunea (Arctiidae).

The *Hyphantria cunea* caterpillars were taken from an apple tree after they had begun their web. As there were no apple trees in the vicinity of my home, they were fed apricot leaves. F. E. Lutz (1921, page 168 states): "It occurs on more than a hundred kinds of trees, apple and ash being their favorites." They seemed to feed very well on apricot leaves, but they did

not spin much silk and were rather sluggish in their movements. Upon removing some of the old apple leaves to examine them for the shed skins, there were, besides some skins, a number of caterpillars which were tightly fastened to the leaf by a cocoon which was also fastened to the caterpillar between the first four pairs of prolegs. These cocoons were 5 mm long. On the fresh leaves other caterpillars were still crawling which also had these cocoons fastened to them. All of them which were thus parasitized, were removed. However, every day there were from six to ten more caterpillars fastened to the side of the tin in which the nest was kept, or to the cloth which covered it, or to the leaves. Not one escaped. They all died in this manner when only 15 mm long. L. O. Howard (1897, pp. 24-25) describes this parasite, *Apanteles hyphantriae* Riley, as follows;—"This species which is an extremely common and important parasite of Hyphantria cunea . . . attacked only half-grown caterpillars of the web-worm. . . . When affecting Hyphantria, the white cocoon is formed almost under the middle of the half-grown caterpillar, and is fastened securely to the object its host happens to rest upon, and slightly to the host itself. . . . But one *Apanteles* is found in a caterpillar, so that each white cocoon indicates the death of a victim."

The only skins obtained, were those cast by the larvae before they showed the parasite's cocoon. These were very hairy; much more so than either the tussock moth or the tent caterpillar. The head capsule was intact, showing only the occipital foramen, where it had joined the thorax. Although the skins were transversely wrinkled from being pushed down off the posterior end of the caterpillar, they were not invaginated.

The skins were examined dry, being placed on a slide with a few drops of water to prevent their being blown away. The dried exuviae, with the exception of the thorax, retained the shape of the larvae. Not one of the skins obtained in the two moults showed the mid-dorsal rupture.

First exuviae. Most of these skins showed a lateral split on each side of the thorax, separating the ventral surface with

the three pairs of thoracic legs from the dorsal surface, which retained only the meso- and meta-thorax. The pro-thorax was pulled off with, and still attached to, the head. The skins split as follows:—7 showed no split whatever, the head was separated; 16 showed lateral splits on each side of the thorax, dorsal prothorax was missing; 1 showed a lateral split on each side of three thoracic segments with no segments missing; 3 showed lateral splits on each side of the thorax, with the dorsal surface of the three segments missing.

Second exuviae. None of these had split at all, and in only one case was a little nick seen on each side of the prothorax. 68 skins were examined.

Of the 29 head capsules measured, ranging in width from 0.8626 to 1.4528 mm, 25 had the dorsal prothorax still attached and 4 had not.

MALACOSOMA AMERICANA (Lasiocampidae).

Abandoned nests of *Malacosoma americana,* or Tent caterpillar, were cut from the wild cherry trees June 23, 1933; and after examining the exuviae contained therein, it was discovered that those from the first moult were missing. F. E. Lutz (1921) says of the tent caterpillar, "Their first act seems to be to spin a temporary silken tent around what is left of the egg mass. If this is in a good place from which to go out for food, they may make their permanent tent here, but usually they move, in several days, to a fairly large fork of a tree and there construct the web." Accordingly on April 20, 1934, fresh nests of the tent caterpillar, which the latter were just beginning to spin were cut from the wild cherry tree for observation, and for obtaining the exuviae from the first moult. The larvae were fed fresh wild cherry leaves until May 11, when the nests were destroyed and the exuviae taken out. At this time the larvae destroyed with the nest were of various lengths, ranging from 6 mm to 39 mm. As moulting takes place within the nest, these slightly hairy exuviae were entangled in the silken web. Besides being transversely wrinkled, they were flattened; the skins being stuck together and hardened, and were very brittle. Being of a very dark

color, with two broad, black lines on the dorsal surface, running the length of the larvae, it was impossible to detect any splits in the skins in this shortened, hardened, opaque condition. Soaking in water for a week did not soften them. However boiling for 10 minutes in 10% solution of sodium hydroxide did soften the skins so that they could be examined. Both examination and measuring were done with wet skins. They were put on a slide under the dissecting microscope and gently pulled until all the folds were smoothed out. Often they pulled out to twice their length in the dried state. The distance was then measured between each pair of legs, starting with the third thoracic leg and ending with the last proleg. The same method was used as that described on a previous page for the tussock moths. At the same time the manner of the splitting in the exuviae was noted and recorded. The figures of the measurements were then arranged in order from the smallest to the largest.

First exuviae. 9 exuviae measured in this moult ranged in size from 2.633 mm to 3. 859 mm; 8 skins showed no split whatsoever in the thorax; 1 skin showed a split in the mid-dorsal line through the first 2 thoracic segments; 1 attached head measured 0.454 mm in width; 1 attached head measured 0.4994 mm. Although the majority of the head capsules were detached from the rest of the exuviae, a few remained attached, and these were measured. None showed any splits.

Second exuviae. 16 skins measured from this moult varied in length from 4.313 mm. to 5.448 mm. 1 of these skins showed no split whatsoever, the others split along the mid-dorsal line; 8 through 2 thoracic segments and 7 through 3 thoracic segments. 4 attached heads measured 0.681 mm. in width.

Third exuviae. 18 skins were measured from this moult. The smallest measured 7.137 mm and the largest 8.9438 mm; 18 split along the mid-dorsal line in 3 thoracic segments; 4 attached heads measured 1.089 mm. and 1 head measured 1.362 mm.

Fourth exuviae. 104 skins seem to belong to this moult. In all these skins there is not more than 0.5 mm difference be-

tween any two successive sizes. All of these skins were taken from the abandoned nests of 1933. The smallest of these measured 10.609 mm, and the largest 16.798 mm. All split in the mid-dorsal line and of these, 5 split through the first and second thoracic segments, 93 split through three thoracic segments and 6 split through three thoracic and one abdominal segment. The smallest head from this moult measured 1.4528 mm.

Fifth exuviae. 35 skins were measured in this moult. These were the largest skins found in the web, and should therefore be the last moulted skins before the larvae spun the cocoons. All split along the mid-dorsal line, 27 through the thorax only and 8 through the thorax and the first abdominal segment.

Last larval moult. These skins were shed after the larvae had spun the cocoons. The head capsules were still attached to the rest of the exuivae, but badly crushed. These skins were jammed in a tight ball about 5 mm in diameter, in the bottom of the cocoons. They were boiled for 20 minutes, but even this failed to cause them to open. They were pulled open with the needles, but this damaged them too much to make accurate measurements. Most of the skins showed only the split through the three thoracic segments.

The pupal skins. The mid-dorsal split was through all three thoracic segments, connecting with a transverse split between the thorax and abdomen on the dorsal surface, extending along the dorsal edge of the wings for two abdominal segments. There was no ventral split.

Moulting Fissures of Caterpillars removed from their Cocoons.

In 1935 some further observations were made to ascertain if the splits in the exuviae of the last larval moult from caterpillars which had been removed from their cocoons are of the same extent as the splits in exuviae from caterpillars left within the cocoons.

It was rather difficult to judge when was the best time to remove the caterpillars from the pupal case. If removed immediately after spinning the cocoon, some would spin a second

cocoon. If allowed to rest awhile after the cocoon was finished before being taken from it, many caterpillars would remain inert, and would not moult but would die. If allowed to remain in the cocoon a day, they had already moulted in the cocoon.

Hemerocampa leucostigma, July 6, 1935, 20 caterpillars spun cocoons and were removed from them and placed on tissue paper in a cardboard box, with a wet blotter in one end. 1 respun a cocoon and was again removed but died later; 13 others died also; 6 moulted outside the cocoon. From these pupae 2 adults emerged (female) July 14; 2 adults emerged (females) July 15; 1 adult emerged (female) July 16; 1 adult emerged (male) July 17.

Manner of splitting of last larval exuviae:—All had the head capsule still attached to the rest of the exuvia, showing the Y-split and the split continued down the mid-dorsal line of the thorax and the first abdominal segment; one exuvia broke. This corresponds exactly to the extent of the splits of the exuviae of the female caterpillars within the cocoons as mentioned on a previous page. The pupal skins also ruptured normally.

Malacosoma americana, June 6, 1935, 85 cocoons were removed from four nests; 52 had already transformed to pupae, 15 were parasitized and discarded, 18 were still caterpillars. The 52 pupae were placed on tissue paper in a cardboard box and 19 hatched out as moths; many of the others were parasitized, for every day large wasps were found in the box, although it was kept in a screened, enclosed shed. Of the 18 caterpillars, 4 taken from the cocoons in the morning, moulted before 9 p. m., June 6; 1 shed its skin before 9 a. m. June 7; 2 spun a cocoon, were removed and later moulted; 11 died.

In all the larval exuviae, the head capsule remained attached; 4 split in the mid-dorsal line through the thorax only, 2 split through the thorax and the first abdominal segment, 1 split through the first two thoracic segments. These splits differ little or none from those in the exuviae taken from the pupal cases mentioned on a previous page. The pupal skins also

ruptured the same way. It therefore matters little whether a caterpillar moults within the cocoon or out of it, the extent of the split is the same.

SOME PREVIOUS DESCRIPTIONS OF MOULTING IN LEPIDOPTERA.

Eidmann (1924, pp. 590) stated, "Bekanntlich reisst die Cuticula bei der Häutung stets an der gleichen Stelle, der sogenannten Häutungsnaht, oder-linie, die sich bei der weitaus grössten Mehrzahl der Insekten auf der Dorsalseite des Körpers von der ersten Abdominalsegmenten in der Medianlinie über den Thorax bis zum Kopf erstreckt, wo sie sich Y-oder T-förmig gabelt. . . . Bei den Raupen der Lepidopteren . . . wird zunächst der Kopf an der Verwachsungsstette mit dem Körper abgesprengt und die Larvae arbeitet sich aus dem Sackförmigen Futteral heraus." He evidently does not include the last larval moult in the cocoon.

K. L. Henriksen (1932) gives an interesting description, particularly of the moulting of the pupal skin. He states, "As well known since the time of Reaumur (1734), the caterpillars of Lepidoptera moult through a rent along the 3 thoracal segments, posteriorly also often traversing the first abdominal segment. Anteriorly this splitting line may continue into the head and form the usual Y (for instance in *Vanessa*), but in other instances (for instance Hesperidae) no opening of the head capsule takes place; the head of the new instar is drawn back through the occipital foramen of the old head capsule and out through the rent in the thoracic region. As the obtect pupa of the Lepidoptera is more specialized than the common exarate pupa of other insects, also a more specialized moulting manner might probably be expected in the Lepidoptera, and this is also the case, as already Reaumur (1734) has described. The base is indeed still the paired sagittal rent, which however only traverses the dorsum of the 2 wing-bearing segments, but not the pronotum nor the head, instead of which supplementary rents have appeared. From the posterior point of the sagittal split the rent continues to each side along the hind border of the wing buds, either stopping on the side in about the height of the spiracles (*Vanessa*) or continuing around the venter. Then they may join the lower part of another rent,

which is in every case present, outlining the entire part medially to the wings, viz the head, antennae and legs; the uppermost, dorsal point of this latter rent joins the anterior point of the dorsal sagittal rent. Thus the pupal cuticle . . . opens anteriorly either through 3 flaps (1 ventral, 2 dorsal) or will break into 4 separate pieces."

When the author began raising the caterpillars, their future sex was not taken into consideration. The larvae were all raised in one large tin, irrespective of when they emerged from the egg. Mosher and Webber (1914), who raised larvae of the gypsy moth, kept the larvae of one age in the same tray, using smaller trays for the small larvae and larger ones for the older larvae. "These trays had a band of tangle foot one inch wide, on the upper inside margin, to prevent the escape of the larva or intrusion of others. Each tray was inspected daily and it was found that those larva which pupated in the fifth stage produced male moths, while those larva having a sixth stage developed females." They report Prof. C. H. Fernald (1896), p. 305 as stating that out of a batch of 55 newly hatched larvae (of the gypsy moth) 52 completed their transformations with the following results, 1 female moulted 6 times, 29 females moulted 5 times, 9 females moulted 4 times, 7 males moulted 5 times and 6 males moulted 4 times.

Gaines and Campbell (1935, p. 460) state: "The frequency of the head measurements showed that the larvae from corn and hegari had 6 instars, whereas those from cotton had 7 instars."

If these variations occur in gypsy moths and corn ear worms, they may occur in other species also. The only means the author employed to determine to which moult the exuviae belonged, were their appearance and length. All of the largest exuviae found would then, no doubt, be those of future females.

Determination of the Exuviae. Dyar (1890) pointed out that "the widths of the head of a (Lepidopterous) larva in its successive stages follow a regular geometrical progression." If this be true of the heads it may be approximately true of the

length of the body. Taking the reciprocal ratio of that of Dyar, (dividing the length of the live tussock larva just emerged from the egg, into that of the larva just finishing the first moult) we got a ratio of 1.70; the length of the second instar larva into that of the third gives us the ratio of 1.38. Dividing the average length of the exuviae of each moult into that of the succeeding moult we get the following ratios;—1.45; 2.24; 1.83; 1.45. These ratios with the exception of the second, fall within the range of 1.28 to 1.84 noted by Calvert (1929, p. 251) as given by Ripley for *Agrotis ypsilon*. Such being the case, the allotting of the exuviae to the different moults seems to be correct. However, for the present purpose, it is the nature of the splitting and not the exact determination of the moults, that is the more important.

There is still the question as to whether the fall-web worm would have exhibited the mid-dorsal split in later moults. If not, this species shows a deviation from the generally accepted statement, that Lepidopterous larva moult by a mid-dorsal split on the thorax.

The Tussock Moth, the Tent Caterpillar and the Fall web worm all show in the majority of the exuviae of each species and in the same moult, splits of the same extent, but there is a minority which varies in this respect. The majority of the exuviae of all larval moults, except the last larval of the Tussock Moth, split to the same extent. The same is true for the Tent Caterpillar. The Fall-web worm has the two lateral splits through the thorax in the first moult, at least, while the other two species show a mid-dorsal split and sometimes none at all.

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Some Records of Orthoptera From South-western Pennsylvania

By HENRY FOX and GEORGE B. OSTERMAN,
Department of Biology, University College, New York University.

A collection of Orthoptera, made by the junior author during the summer of 1936 in the vicinity of Washington, Pennsylvania, possesses considerable interest. It was obtained in a section from which only meagre data on the group have hitherto been published and reveals an unexpected extension of range for several species whose main distributional area is far to the south or west of this region. The collection was brought to New York and submitted to the senior author, who checked over and verified or corrected the provisional determinations made in the field.

According to Merriam's map of the life zones of the United States, the locality at which these specimens were secured lies near the line of contact between the Transition zone and the Carolinian division of the Upper Austral Zone. The former extends as a wide band from New York State across Pennsylvania and is thence carried along the Appalachians and the higher portions of the Alleghany plateau as far as northern Georgia. In Pennsylvania and West Virginia the western margin of this zone roughly coincides with the eastern limits of the Ohio River drainage basin, which otherwise lies wholly within the Upper Austral Zone. The mixed character of the fauna, which is thus implied, is substantiated by the present series of Orthoptera. Certain species in this series as *Orphulella speciosa, Encoptolophus sordidus, Neoconocephalus ensiger,* and especially *Scudderia pistillata,* are generally northern in distribution; while others, as *Syrbula admirabilis, Hippiscus rugosus, Trachyrhachis kiowa fuscifrons,* and *Melanoplus differentialis,* are typically austral in range.

The topography of the region in which Washington is situated is similar to that of the general Alleghany Plateau. As is shown on the topographic maps of the Amity and Claysville quadrangles published by the United States Geological Survey, the surface in the general vicinity of the town ranges in altitude from about 1000 feet in the lowest valleys to 1250 to 1400 feet on the summits of the larger hills. The latter elevation corresponds to the general altitude of the original, nearly level surface of the plateau, out of which the present diversified topography of the region has been carved. Consequently, although at a distance the summits present a nearly level skyline suggestive of an ancient stage of peneplanation, the present surface is remarkably rough and rugged, having been cut up by erosion into a confused network of short ridges, separated from one another by deep and generally narrow valleys. Hence, when viewed from the valleys, the scenery presents more nearly the aspect of a district of low mountainous elevations than of the deeply dissected table-land, out of which the geological structure of the country shows the present surface to have been produced through erosion.

Formerly the country about Washington was heavily forested, but practically all the original timber has long been removed and at the present time about all that is left are scattered tracts of second-growth timber springing up on the more preciptious slopes or capping some of the higher summits. Hardwoods predominate, the oaks forming the most conspicuous component.

The rapid and extensive removal of its forests was doubtless due in large part to exploitation of the rich coal and oil deposits of the region. It was presumably also responsible for the present impoverished state of the soil, which, except for occasional minor tracts of alluvium in some of the wider valleys, is generally thin and full of angular stony fragments.

The following list includes only the species of Orthoptera represented in the collection and doubtless falls far short of being a complete list of all species of the group represented in the region. In view of the fact that the Alleghany Plateau is one of the outstanding centers of distribution for brachypterous melanopli, it is rather surprising to find none of that group in the collection. However, the extensive deforestation, to which the country about Washington has evidently been subjected, may perhaps account for the absence of these characteristically sylvan and usually locally restricted types. Doubtless future field work on a larger, and more intensive, scale will bring to light such forms, as well as other sylvan types similarly noted for their highly restricted habitat relations.

NOMOTETTIX CRISTATUS COMPRESSUS Morse. VIII 30, 1 ♂, 3 ♀, 1 juv. ♂.

Reference of the specimens to this race is made with some hesitation. They are not typical, having the distinctive racial characters much less clearly defined than in typical material of *compressus* from west-central Tennessee, and approximating *cristatus cristatus*, to which race the present material is evidently transitional, as would be expected from its geographical location. Occurring in a hay stubble field on level, partly moist ground near a small stream.

ACRYDIUM ORNATUM Say. VIII 30, 3 ♂, 1 ♀, 4 juv. ♂, 4 juv. ♀. Taken in the same surroundings as the preceding.

A. ARENOSUM ANGUSTUM (Hancock). VIII 30, 1 ♂. Associated with *ornatum*.

TETTIGIDEA LATERALIS LATERALIS Say. VIII 23-30, 10 ♂, 11 ♀, 4 juv. ♂, 5 juv. ♀. Occurring in the same places as the other grouse-locusts and apparently the most abundant local representative of the group.

SYRBULA ADMIRABILIS (Uhler). VIII 30, 1 ♀. Taken in a field of timothy stubble on nearly level ground in the bottom of a ravine. This is apparently the first record of the occurrence of this attractive grasshopper in Pennsylvania and its presence at Washington at an altitude of fully 1000 feet would seem to indicate a much greater northward extension of its range in the lowlands of the Ohio drainage than is the case east of the Appalachians where its northermost known limits are Burlington and Lakehurst, N. J., both localities less than 50 feet above sea-level.

ORPHULELLA SPECIOSA (Scudder). VII 9-26, 3 ♀, 1 juv. ♀. Occurring on stony ground in a closely cropped hillside pasture.

DICHROMORPHA VIRIDIS (Scudder). VII 25-VIII 23, 1 ♂, 3 ♀, 1 juv. ♀. Hay stubble field on nearly level moist ground near stream.

ARPHIA XANTHOPTERA (Burmeister). VIII 23-30, 2 ♂, 3 ♀. Associated with the preceding. Also taken on higher ground of rocky roadbed and adjoining slopes of hillside.

A. SULPHUREA (Fabricius). VI 21-VII 9, 2 ♂. Rocky ground of pasture at hill summit near small woodland tract.

CHORTOPHAGA VIRIDIFASCIATA (De Geer). VI 12-VII 12, 1 ♂, 4 ♀. Generally distributed in early summer in fields and pastures.

ENCOPTOLOPHUS SORDIDUS (Burmeister). VIII 22-30, 6 ♂, 12 ♀, 2 juv. ♀. Widely distributed in fields and pastures.

PARDALOPHORA APICULATA (Harris). VI 21, 2♂, 2 ♀: VIII 30, 1 juv. ♂, 3rd instar. Grazed hillside pasture in briery tracts of short, dry grasses. One female has the tegmina definitely maculate and in general appearance so closely resembles *phoenicoptera* (Burm.) that it was at first mistaken for that species, but a later examination showed it to be only an aberant example of the present species.*

HIPPISCUS RUGOSUS (Scudder). VIII, 23-30, 1 ♀, 1 juv. ♂, 1 juv. ♀. Hillside pasture on stony soil in low and sparse herbage. Apparently the first record of the species for western Pennsylvania and a north-eastern limital record in the Mississippi drainage area.

* The reverse condition in which *P. phoenicoptera* exhibits the colorational pattern of *apiculata*, is shown in a male taken by the senior author June 27, 1936, at Ocean View, New Jersey, which in all structural features is typical *phoenicoptera*.

DISSOSTEIRA CAROLINA (Linnaeus). VII 5-19, 1 ♂, 1 ♀, 1 juv. ♂, 1 juv. ♀, adult as early as the first date. Practically ubiquitous.

SPHARAGEMON BOLLI Scudder. VII 26-VIII 30, 1 ♂, 5 ♀. Hillside pastures on stony ground near wooded tracts.

S. PLANUM Morse. VIII 8-23, 2 ♂, 2 ♀. Apparently a western limital record of this monutain-dwelling species. Taken in an open pasture on stony ground in the same general type of surroundings as *bolli*. One male approaches the latter in the form of the pronotal crest, but the other is typical of the species in this feature.

TRACHYRHACHIS KIOWA FUSCIFRONS (Stal). VII 13-24, 4 ♂, 2 ♀, 2 juv. ♀. Local on stony surface of old, abandoned roadbed on lower slope of hill. This record, the first of the species from Pennsylvania, extends its range far to the east of its previously known limits in that direction.

MELANOPLUS MEXICANUS (Saussure). VII 9-12, - 1 ♂, 1 ♀. On stony ground of old, weedy field on hill summit.

M. FEMUR-RUBRUM (De Geer). VIII 8-23, 1 ♂, 3 ♀, 2 juv. ♂, 1 juv. ♀; earliest adults, VIII 16. Swarming everywhere in fields, meadows and pastures.

M. DIFFERENTIALIS (Thomas). VII 23-VIII 23, 2 ♂, 4 juv. ♂, 6 juv. ♀; earliest adults, VIII 8. Partly moist tract in valley bottom near stream. Apparently a north-eastern limital record of the species, if one disregards the secondarily established colonies occurring, east of the Appalachians, in the lower Delaware valley and the coastal sections of New Jersey.

MELANOPLUS BIVITTATUS (Say). VII 9-26, 3 ♂, 2 ♀, 1 juv. ♀ (VII 12). Lower hill slopes, mostly in damp situations.

SCUDDERIA TEXENSIS (Sauss. & Pict.). VIII 8-23 1 ♂, 3 ♀. Meadows in valley bottom.

S. PISTILLATA Brunner. VII 26, 1 ♂. Weedy and bushy hillside field. Appears to be a western limital record in the southward extension of the range of this northern species along the mountains.

S. CURVICAUDA (De Geer). VII 26, 1 ♂. Bushy hillside field.

NEOCONOCEPHALUS ENSIGER (Harris). VII 23-VIII 26, 3 ♂, 1 juv. ♂, 1 juv. ♀; earliest adults, VIII 8. Partly marshy tract near stream in valley bottom.

ORCHELIMUM VULGARE Harris. VIII 8, 2 ♂. Weedy field.

CONOCEPHALUS FASCIATUS (De Geer). VII 23-VIII 22, 1 ♂, 3 ♀. Weedy meadow in lowlands.

C. STRICTUS (Scudder). VIII 30, 1 ♀. Weedy meadow.

NEMOBIUS FASCIATUS (De Geer). VIII 30, 1 juv. ♀, not racially determinable, but presumably the typical form of the species.

GRYLLUS ASSIMILIS FABRICIUS. 1 ♀, undated. Residential grounds.

OECANTHUS NIGRICORNIS QUADRIPUNCTATUS Beutenmuller. VIII 16, 2 ♂, 2 ♀. Weedy pasture and grassy tracts in dry stream bed. One of each sex shows a slight approach toward *nigricornis nigricornis* F. Walker in having a narrow, median black band extending from the occiput to the middle of the pronotum and in the blackish tint of most of the ventral surface of the abdomen.

Pairing of Males of Samia cecropia. (Lep.: Saturnidae).

By H. E. WOODCOCK, Chicago, Illinois.

The amateur naturalist should not spurn the most simple and well known experiments in the thought that they can develop nothing new—that conditions may enlarge or vary the results, sometimes in a surprising manner, is evidenced by the following recital.

Early in June the writer placed a newly emerged female *Samia cecropia* in a box with a screened lid. The next morning as late as 9 A. M. over 50 males were present. That night I placed another female in the same box and left both outside during the night. At 7 A. M. the following morning the box was literally covered with males and there were also a number on the ground and on surrounding plants.

The temperature was in the fifties, quite chilly, and the insects were extremely lethargic—so much so that I picked up practically all of them, only one or two taking flight. Placing the catch on a sheet inside, I counted carefully as I took them one by one from the box, and found 130 specimens. Quite probably some had left prior to daybreak and indeed during the day I found several more around the yard under bushes and other plants.

There was not, however, a single specimen in the whole catch that would be accepted by a collector as a fitting specimen, all being badly battered and worn, wings broken and frayed. All antennae, however, were intact.

There were among the group picked up, four "pairs" i.e., males, which were quite securely attached to each other at the point of the abdomen containing the claspers. As closely as I could ascertain, the claspers of one of them had been driven

into the body of the other so close to the claspers that I thought at first they were merely hung together by the claspers, but a fairly strong pull failed to separate them. A drop of body fluid, nearly the size of a green pea was oozing from the body of the insect pierced, lending weight to the idea that the claspers had actually penetrated the body. I did not, unfortunately, examine them under a glass to be sure of this, but I am certain that a strong pull did not separate them. I placed a pair outside in a bush, and found them still so joined together hours later. I then put a pair in a killing jar and in their struggles they came apart. This pair I sent to Mr. Gerhard of the Field Museum to ask him to verify the fact they were both males. He verified this and remarked on the drop of (then) hardened fluid, on the abdomen of one of them. I gave Mr. Gerhard a full report on this incident. None of the males, up to this point, had been allowed to get into the box with the females.

My own theory, a matter of conjecture only, is that the unusual crowd of males all endeavoring for hours to reach the two females, created such a strong sensual atmosphere that these pairs of males sought to mate with each other. Nothing else can account for it unless it be their manner of mortal combat (use of the claspers) of which I have never read. Mr. Gerhard believes the male claspers sufficiently chitinized to pierce the abdomen of another male. I have been told there is no record of such an incident, and in previous years I have never seen it either, but I have also never seen over 130 males trying to reach one pair of females at the same time.

The above occurred in the back yard of my home, which, while in the city limits of Chicago, is still within a mile of the western boundary.

New Records from Bait Traps. (Dipt., Coleop., Corrodentia).[1]

By S. W. Frost, The Pennsylvania State College.

Since the publication of my paper "A Summary of Insects Attracted to Liquid Baits,"[2] determinations have been made of a number of additional species. Mr. Maurice T. James, Colorado Agricultural Experiment Station, identified twelve species of Stratiomyidae taken from baits in the vicinity of Arendtsville, Pennsylvania, during 1928. The habits of the Stratio-

[1] Authorized for publication on October 6, 1936, as paper No. 741 in the Journal Series of the Pennsylvania Agricultural Experiment Station.
[2] Ent. News XLVII: 64-68, 89-92, 1936.

myidae are not too well known and hence notes on these species seem worth while. They are found on plants and apparently do considerable feeding on nectar and drops of liquid on foliage. It is not strange that they were taken in considerable numbers in baits. The baits consisted chiefly of various brands of refiner's syrup diluted with twenty parts of water. Nine of the 18 genera mentioned in the "List of Insects of New York State" were taken. The species are: *Allognosta fuscitarsis* Say, June 26, July 3, 24; *Actina viridis* Say, June 26, Oct. 8; *Geosargus cuprarius* Linn., June 26, Oct. 8; *Microchrysa flavicornis* Meig, June 24, Oct. 1; *Stratiomyia norma* Wied., July 7, Sept. 11; *S. meigenii* Wied., July 7, 24, Aug. 21; *S. quartenaria* Loew, Aug. 14; *Odontomyia interrupta* Oliv., May 7, 14; *O. virgo* Wied., July 7; *O. borealis* James, July 10; *Euparyphus tetraspilus* Loew, June 26, July 3; and *Oxycera picta* V. d. W., June 26.

There are a few records of Trupaneidae. *Rhagoletis cingulata* Loew, was taken during June from traps hung close to cherry trees. Another species, *Procecidochares atra* Loew, was taken on September 27.

Mr. J. N. Knull, Ohio State University, made the following determinations of Cerambycidae which are additions to the species listed previously; *Centrodera picta* Hald, May 13; *Anoplodera nitens* Forst, June 29; *Strangalia luteicornis* Fab., June 29, July 7; *Xylotrechus colonus* Fab., May 1, 18; *Clytoleptus albofasciatus* Lap., May 18; *Leiopus fuscicularis* Harris; and *Typocerus velutina* Oliv., July 7.

Two psocids, identified by Dr. P. J. Chapman, were taken in baits; *Psocus petiolatus* Banks, Oct. 14, and *Polypsocus corruptus* Hagen, Oct. 4.

The unusual *Oncodes incultus* O. S. (Cyrtidae) which is parasitic on spiders, was taken in traps that were hung on a hickory tree some distance from the orchards.

Stylogaster biannulata Say, is the only representative of the Conopidae taken in baits.

OWING to non-receipt of corrected proof from several authors in time for inclusion in the July NEWS, we have been obliged to depart from our usual policy and to extend one continued article beyond our customary limit.—EDITOR.

Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, Jr.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual volume, and in some cases the part, heft, &c. the latter within ( ) follows; then the pagination follows the colon :

All continued papers, with few exceptions, are recorded only at their first installments.

(*) Papers containing new forms or names not so stated in titles, have an * within parentheses thus (*) following the pagination of reference to paper.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

Note. Titles of papers containing new forms or new names will be indicated by an asterisk within parentheses at end of reference, (*).

Papers published in the Entomological News are not listed.

GENERAL.—Ahmad, T.—Importance of the study of insect ecology in applied Entomology. [Indian Jour. Agr. Sci.] 7: 156-167. **Bruner, Lawrence.**—Obituary by E. P. Van Duzee. [55] 13: 68. **Kesselyak, A.**—Ueber einen Zweckmassig abgeanderten Exhaustor. [79] 23: 53-54, ill. **Kinsey, A. C.**—Supra-specific variation in nature and in classification. [90] 71: 206-222, ill. **L'Heriter, Ph.**—Etude de variations quantitatives au sein d'une espece, Drosophila melanogaster (Diptera). [Arch. Zool. Exp. Gen., Paris] 78: 255-356, ill. **Pictet, A.**—Un physiologiste des Insectes. Le Dr. Frank Brocher, 1866-1936. [41] 16: 749-761. **Ruediger, E.**—Maria Sibylla Merian. [17] 54: 391-394. **Scheerpeltz, O.**—Ueber Totung, Konservierung und Praparation von Kafern. [79] 23: 1-10, ill.

ANATOMY, PHYSIOLOGY, ETC.—Becker, E.—Die Farbstoffe der Insekten. [17] 54: 338-340; 346-347; 368-370. **Carpentier, F.**—Le thorax et ses appendices chez les vrais et chez les faux Gryllotalpides. [Mem. Mus. R. Hist. Nat. Belg.] (2), Fasc. 4, 86 pp., ill. **Chevais, S.**—Sur la structure des yeux implantes de Drosophila melanogaster. [Arch. Anat. Miscr., Paris] 33: 107-112, ill. **Eggert, B.**—Die imaginalen Tracheenkiemen von Protonemura nitida (Plecoptera). [34] 118: 113-117, ill. **Florkin, M.**—Contributions a l'etude du plasma sanguin des insectes. [Acad. R. Belgique Classe Sci. Mem.] 16, fasc. 5: 69 pp. **Gaunitz,**

C. B.—Tvestjärten, Forficula auricaria, som blodsugare. [28] 58: 75-79. **Goodrich, A. L.**—The head capsule of a Trichopterous pupa, Dicosmoecus atripes (Limnophilidae). [Trans. Amer. Miscr. Soc.] 56: 243-248, ill. **Gouin, F.**—Metamorphoses de quelques Chironomides. [Rev. Franc. Ent.] 4: 53-60, ill. **Hertz & Imms.**—On the responses of the African migratory locust to different types background. [Pro. Roy. Soc. London] (B) 122: 281-297. **Jucci, C.**—La attivita secretive delle ghiandole serigene nei bachi da seta (Bombyx mori). [Boll. di Zool.] 8: 25-38. **Kann, F.**—Temperatureinflusse auf die Wachstumstadien von Dixippus [Carausius] morosus (Orthopt.: Phasmidae). [Biol. Gen.] 13: 25-66, ill. **Kuwana, Z.**—Reducing power of the body fluid of the silkworm. [Japan. Journ. Zool.] 7: 273-303. The excretion of uric acid in the silkworm larva. [Japan. Journ. Zool.] 7: 305-309. Statistics of the body weight of the silkworm. [Japan. Journ. Zool.] 7: 311-346. **Mellanby, K.**—Water and fat content of tsetse flies. [31] 139: 883. **Nolte, H. W.**—Beitrage zur Kenntnis der symbiontischen Einrichtungen der Gattung Apion. [46] 33: 165-200, ill. **Roy, D. N.**—The physiology of digestion in the larvae of Gastrophilus equi (Diptera). [116] 29: 150-162. On the function of the pharyngeal ridges in the larvae of Calliphora erythrocephala (Diptera). [116] 29: 143-149, ill. **Turdakow, F.-A.**—Die Präembryonale Auswahl beim Maulbeer-seidenspinner (Bombyx mori). [Arch. Zool. Exp. Gen., Paris] 78: 231-253. **Van Dam, L.**—Ueber die Atembewegungen und das Atemvolumen von Phraganea Larven, Arenicola marina un Nereis virens, sowie uber die Sauerstoffausmutzung bei Anodonta cygnea, Arenicola marina und Nereis virens. [34] 118: 122-128. **Wiesmann, R.**—Zur Diapause der Kirschfliege, Rhagoletis cerasi. [41] 16: 727-729.

ARACHNIDA AND MYRIOPODA.—Anon.—Spiders and their kin. [Cornell Rur. School, Cornell Univ.] Leaflet 30, No. 2: 3-32, ill. **Bryant, E. B.**—N. spp. of southern spiders. [5] 43: 87-101, ill. **Fox, I.**—Notes on North American Lycosid spiders. [10] 39: 112-115, ill. (*). **Gertsch & Wallace.**—New American Lycosidae with notes on other species. [40] No. 919, 22 pp., ill. **Kessel & Kessel.**—(See under Diptera.) **Madsen, H.**—Biology of a littoral mite [Greenland] [31] 139: 715. **Masters, E.**—The black widow spider. [Bull. Nat. Hist. Soc. Md.] 6: 6 pp., ill. **Peters, H.**—Studien am Netz der Kreutzspinne (Aranea

diadema). II. Ueber die Herstellung des Rahmens der Radialfaden und der Hilfspirale. [46] 33: 128-150, ill.

THE SMALLER ORDERS OF INSECTS.—Adamson, A. M.—Preliminary report on termites and termite damage in Trinidad, West Indies. [Trop. Agric.] 14: 141-149, ill. **Bailey, S. F.**—The Jones collection of Thysanoptera. [55] 13: 89-93. **Banks, N.**—Notes on some Hydropsychidae (Trichoptera). [5] 43: 126-130, ill. (*). **Bohart, R. M.**—A preliminary study of the genus Stylops in California, Pt. II, (Strepsiptera). [55] 13: 49-57, ill. (*). **Silvestri, F.**—Description of a n. sp. of Symphlurinus (Dicellura) from Central America. [40] No. 920, 3 pp., ill. **Tillyard, R. J.**—Kansas Permian Insects. Pt. 19. The Order Protoperlaria. Family Probnisidae. [16] 33: 401-425, ill. (*). **Upholt, W. M.**—Two new Mayflies from the Pacific coast. [55] 13: 85-88. **Williams, F. X.**—Notes on the biology of Gynacantha nervosa (Aeshninae), a crepuscular dragonfly in Guatemala. [55] 13: 1-8, ill.

ORTHOPTERA.—Cappe de Baillon, Favrelle & de Vichet.—Parthenogenese et variation chez les Phasmes. [78] 71: 129-189, ill. **Carpentier, F.**—(See under Physiology.) **Elsea, J. E.**—A new locality for Grylloblatta. [55] 13: 57. **Gurney, A. B.**—Studies in certain genera of American Blattidae. [10] 39: 101-112, ill. (S*).

HEMIPTERA.—Anon.—The periodic cicada or "17 year locust". [Nat. Hist. Soc. Md.] Special Bull. May, 1936: 4 pp. **DeLong, D. M.**—Some new Deltocephaloid Leafhoppers from Illinois (Cicadellidae). [55] 13: 32-34. The genus Chlorotettix (Cicadellidae): some notes on synonymy. [55] 13: 34-35. **Essig, E. O.**—A new Aphid from California (Aphidae). [55] 13: 46-48, ill. **Helmsing & China.**—On the biology and ecology of Hemiodoecus veitchi (Peloridiidae). [75] 19: 473-489, ill. **Jensen-Haarup & Wagner.**—Einige neue Pentatomidarten aus der Sammlung des Zoologischen Museums in Hamburg. [17] 54: 321-324, ill. (S*). **Van Duzee, E. P.**—Note on Idiocerus provancheri. (Bythoscopidae). [55] 13: 8. A few new Hemiptera. [55] 13: 25-31. A peculiar structure in a Fulgorid. [55] 13: 31.

LEPIDOPTERA.—Anon.—Familiar butterflies of Maryland. [Nat. Hist. Soc. Md.] July, 1936: 30 pp. **Anon.**—Familiar moths of Maryland. [Nat. Hist. Soc. Md.] May, 1930: 19 pp., ill. **Bell, E. L.**—N. gen. & spp. of Neotropical Hes-

periidae, with notes on some others (Rhopalocera). [40] No. 914, 17 pp., ill. **Boursin, C.**—Beitrage zur Kenntnis der "Agrotinae-Trifinae" XX. 1. Morphologische und systematische Studie uber die Gattung Athetis. [17] 54: 364-368; 388-391, ill. (*). **Chermock & Chermock.**—Two new races of Papilio rudkini. [38] 36: 8-10. Two new races of Papilios from Manitoba. [38] 36: 11-13. **Clark, A. H.**—The butterflies of Virginia. [Expl. & Field Work Smiths. Inst.] 1936, No. 3407: 47-52, ill. **Clark & Williams.**—Records of Argynnis diana & of some other butterflies from Virginia. [91] 27: 209-213. **Comstock, J. A.**—A new record and life history (Noctuidae). [38] 35: 169-174, ill. Miscellaneous notes on western Lepidoptera. [38] 36: 19-23, ill. **Comstock & Dammers.**—Life history of Papilio rudkini. [38] 36: 13-18, ill. **Comstock, Sperry & Sperry.**—Notes on the life history of Oeneis daura. [38] 35: 165-169, ill. **da Costa, A. A.**—Morphidoes do districto federal. [Rev. Inst. Biol. Veg. Jard., Rio de Janiero] 11: 213-237, ill. **Cross, F. C.**—A new race of Plebeius scudderi (Lycaenidae). [55] 13: 88. **Dammers, C. M.**—A remarkable instance of a food-plant selection by a butterfly. [38] 36: 23-24, ill. **Forbes, W. T. M.**—The Persius group of Thanaos (Hesperiidae). [5] 43: 104-113, ill. (*). **Haydon, S.**—The Papilionidae of Maryland: a short descrip. of the swallowtail butterflies of this state with notes on the various stages of their life histories. The Satyridae of Maryland: a short description of the satyrid wood-nymph butterflies of this state with notes on the various stages of their life histories. [Pro. N. H. Soc. Md.] Mar., 1933; Feb., 1934: 14 pp., 10 pp. **Hovanitz, W.**—Note on Argynnis skinneri (Nymphalidae). [55] 13: 60. **Lange, W. H.**—Food plant records for two Epinota spp. [55] 13:48. California pine tip moths of the gen. Rhyacionia. [38] 36: 25-34, ill. **Matsumura, S.**—Geographical distribution of Lepidoptera in Pacific countries. [Pro. Fifth Pacific Sci. Cong.] 5:3503-3514. **Meadows, D.**—An annotated list of the Lepidoptera of Santa Catalina Island, California. Pt. I. Rhopalocera. [38] 35: 175-180, (*). **Testout, H.**—Les types de Lepidopteres dans la collection Donzel. [Ann. Soc. Linn. Lyon] 80: 45-76, ill. **Zikan, J. F.**—Neue Nymphaliden-Arten und Formen aus Brasilien. [17] 54: 328-331; 385-387.

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HYMENOPTERA.—Bequaert, J.—A study of the North American Odynerus hidalgo (Vespidae). [55] 13: 9-14 (*). **Cockerell, T. D. A.**—The Bees of Barbados. [9] 70: 111-113. (S*). **Cros. A.**—Osmia longispina, etude biologique [33] 77: 175-185. **Frisch, J. A.**—The life history of the hunting wasp, Ammobia ichneumonia. [Bull. Nat. Hist. Soc. Md.] 5: 7-12, ill. **Linsley & Michener**—Some n. gen. & spp. of North American parasitic bees. [55] 13: 75-84. **Malaise, R.**—Old and new gen. of Arginae (Tenthredinidae). [28] 58: 46-59, ill. Gattungstabelle sowie neue Arten und Gattungen der Unterfamilie Perreyiinae (Tenthredinidae). [28] 58: 60-65, ill. **Mickel, C. E.**—The Mutillid wasps of the genus Timulla which occur in North America north of Mexico. [70] 17: 1-119, ill. (*). **Timberlake, P. H.**—N. spp. of Andrena from California. [55] 13: 69-74.

SPECIAL NOTICES.—Neue Untersuchungen uber die Fossil Insekten mit Erganzungen und Nachtragen sowie Ausblicken auf phylogenetische, paleogeographische und allgemein biologische Probleme. By A. Handlirsch [Ann. Nathist. Mus., Wien] 48: 1-140.

MELANISMUS, ALBINISMUS und RUFINISMUS. Ein Beitrag zum Problem der Entstehung und Bedeutung Tierischer Färbungen. By W. F. REINIG (Scientific Assistant at the Prussian Acad. of Sciences). Pp. 122, figs. 27. Georg Thieme, Leipzig, 1937. Price RM 5.20. To Linnaeus, only morphological variations were significant; not until Darwin, Wallace and Bates showed that variations in color when correlated with ecological and distributional data, might shed light on the origin of species, did color variations become also a subject of scientific interest. Since that time so many observations on the occurrence of extremes of coloration have been made and so many breeding experiments of very unequal significance carried out that the present concise critical review of the whole subject of color anomalies, covering the literature down to and even including part of 1937, is indeed very welcome. This volume deals with the anomalies known as melanisms, albinisms and rufinisms in mammals, birds, reptiles and, especially, in insects. The figures are all of lepidoptera not only because these forms are the most aesthetic but also because most of the experimental work has been done on them. It is also evident that, of the 3 color anomalies, melanism has received most attention. Dark individuals are often larger and sturdier, and the dark color itself is sometimes adaptive (industrial melanism) whereas the reverse is generally true for albinos. These qualities of melanic forms have inspired many efforts to produce experimentally, melanisms which would prove heritable, in order to establish the Lamarckian contention that environment may not only change the appearance of an individual but also induce a corresponding change in the genetic constitution of that individual so that its offspring will inherit the change regardless of environment. In fact, a number of investigators, down to J. W. H. Harrison (1935), believed that they had accomplished such induction. It is true that certain environmental conditions, temperatures, humidity, feeding of chemicals, etc., do produce melanic individuals which resemble those resulting from gene mutations, and it is this similarity in appearance between genetic and environmentally conditioned melanism that has misled those investigators who were not trained geneticists into believing that a heritable change had been induced by an environmentally conditioned change of color. In the more recent type of such experiments, e. g., those of Harrison and Garrett, 1926, 1935, occasional dark specimens, appearing in an inbred line of *Selenia* which was being fed salts of heavy metals, are asserted to be the result of "induction," whereas most geneticists will recognize

such an appearance as an ordinary mutation. Indeed, Harrison's own tables, 1935, record dark individuals in the controls. As regards the geographical distribution, it is well known that although melanic individuals and races may occur anywhere within the range of a species, they are more frequent on islands, on mountains, on moors, in industrial regions and in the vicinity of large cities. In addition, the author calls attention to the concentration of melanic forms at the boundaries of the range of a species. He goes on to express his conviction that melanism, wherever it occurs, is the same sort of thing, that it is fundamentally the same biological phenomenon, and that the causative factor must be some condition common to all the situations in which concentrations of melanic forms occur Since no climatic or other imaginable environmental factors exist which all these situations have in common, the only common factor remaining appears to be isolation. This, then, is the author's theory. In all the situations mentioned, there is a discontinuity in the range of a species and small populations exist isolated from the general range. Recessive genes for dark color may be present, or may appear by mutation, in such an isolated population just as they do anywhere else. When such genes exist in a small population the more intensive inbreeding which necessarily occurs in a small group will spread the gene through the population more rapidly and the frequency with which 2 individuals each having one dark gene mate, by chance, with each other will be greater than in a large population with little inbreeding. Some of the offspring of such matings will have 2 genes for dark color, i.e., be homozygous, and therefore will be actually dark in color.

The proportion of melanic individuals appearing in succeeding years will, even in the isolated population remain small unless selection occurs. Natural selection may gradually increase this proportion and even lead to the formation of a dark local variety, especially when the dark form is at the same time stronger and larger than the type, or has specific physiological characteristics better suited to the particular environment. In industrial regions the dark color will have positive selection value as a concealing color. Albinism is treated by the author the same way. Types are classified, geographical distribution is discussed and again the theory of isolation is applied. Albinos are usually less sturdy and generally possess negative selection value. Red anomalies are less well understood. Red may occur in place of black as in occasional red moles, or in legs of beetles of the genus carabus, either as an individual or

a racial character. The bibliography includes papers by 160 different authors.

R. G. SCHMIEDER.

FRAGMENTS OF ENTOMOLOGICAL HISTORY Including Some Personal Recollections of Men and Events. By HERBERT OSBORN. Columbus, Ohio. Published 1937. Pp. vii, 394, including 44 plates of portraits, 3 plates of entomological laboratories. $4.50. This is the fourth American book on the history of entomology which has appeared in the nineteen-thirties, the other three being Dr. Howard's anecdotal History of Applied Entomology, 1930; Prof. Essig's History of [Pacific U. S.] Entomology, 1931, and Mr. Weiss's Pioneer Century of American Entomology, 1936. The third of these was noticed in the NEWS for July, 1936. Prof. Osborn's "Fragments" "is a record of certain events and sketches of personalities known to the writer," "*not* . . . an attempt at an adequate summary or even as an outline of the development of the science of entomology as a whole." Chapter I, Early Steps in Entomology, emphasizes the factors in the rapid development of Economic Entomology in the United States, as compared with that in Europe, as due largely to the invasions of the Colorado Potato Beetle, Rocky Mountain Locust, Cotton Worm, Gipsy Moth, Boll Weevil, San Jose Scale, European Corn-borer and Mediterranean Fruit Fly following each other in quick succession. Chapter II. The Nineteenth Century, includes some new material on the Melsheimer family, especially an autobiography of Frederick Valentin Melsheimer, supplied by his great-great-granddaughter, Mrs. Ethel Melsheimer Miller, librarian in the Dept. of Zoology and Entomology at The Ohio State University. Chapter III. Federal Service in Entomology is largely a list of personnel. Chapter IV. State Entomologists, Inspectors and Quarantine Officers and V, Experiment Station Entomology, furnish fuller data on the historical side. Chapter VI. Entomological Instruction in Colleges is very unequal, as the author evidently appreciates in his postscript (page 335). It is regrettable that more opportunity was not given to those connected with such instituions as the University of Pennsylvania, to take the case best known to the reviewer, to give more exact data on courses in entomology which have been pursued by students for thirty or more consecutive years. Chapters VII and VIII deal with Entomological Societies and Publications. The longest chapter in the book is IX. Personal Sketches, pages 140-286, containing a great mass of informa-

tion on many entomologists, with numerous portraits. Chapter X gives data on Insect Collections in public and institutional museums. Chapter XI, Some Regional Notes, discusses entomology in the mid-west (the area from Ohio and Kentucky to the Dakotas and Colorado), the Southern States and, more briefly, South and Central America, Mexico, the West Indies and Canada. Chapter XII, Miscellaneous Notes, sketches faunistic studies, problems in nomenclature, studies of fossil insects, entomological libraries and entomological illustration. The index is extensive for names of individuals and for the entries under Experiment Station, Instruction and State Entomologists. It occupies nine pages of fine type, three columns to the page. It would have been more helpful if institutions had also been indexed. The U. S. National Museum, the Museum of Comparative Zoology and others are referred to several times in the book, but we cannot find them in the index. Prof. Osborn's "Fragments" will undoubtedly be of value to that future historian whom he descries on page five of his introduction.—P. P. CALVERT.

Some Current Items.

The issue of *Science* for June 4, 1937, is of special interest to entomologists. It contains an appreciative obituary of Prof. WILLIAM MORTON WHEELER by four of his colleagues at Harvard: L. J. Henderson, Thomas Barbour, F. M. Carpenter and Hans Zinsser. "Wheeler, like the great physicians, could not forget the inconceivable complexity of things as they are and the intricacy of the web of events, but he possessed that intuitive and imaginative understanding which is the naturalist's compensation for his lack of the clear analysis of the physicist." There is an announcement of the death on May 15, of Dr. LEE BARKER WALTON, professor of biology at Kenyon College, Gambier, Ohio, at the age of sixty-six years; in 1927 he published a theory on the origin of insects from annelid worms. The celebration by Washington entomologists, on May 27, of the eightieth birthday of Dr. L. O. HOWARD, which occurred on June 11, is noticed. Prof. W. V. Balduf, of the University of Illinois, writes on "The Volume of Entomological Literature," which he estimates at 100,935 items for the period 1913-1934. He thinks that "entomology should encourage the preparation of occasional summary studies of its literature."

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

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Wanted—Chloropidae (Oscinidae) of the world. Study, determination or exchange. C. W. Sabrosky, Entomology Dept., Michigan State College, East Lansing, Mich.

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HYMENOPTERA

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1028.—**Pate** (V. S. L.).—Studies in the Pemphredonine wasps. I. New genera and species of the Ammoplanoid complex (Sphecidae). (Trans., **63**, 89-125, 2 pls., 1937) ... .80

NEUROPTERA.

1025.—**Denning** (D. G.).—The biology of some Minnesota Trichoptera. (Trans., **63**, 17-43, 1 pl., 1937) ..... .55

ORTHOPTERA

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